PROTECTION OF WATER RESOURCES IN THE BIG CREEK WATERSHED

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Abstract. The 98 square miles of the Big Creek Watershed encompasses five jurisdictions: Alpharetta, Cumming, Forsyth County, Fulton County and Roswell. Big Creek itself is a major tributary of the Chattahoochee River, source of drinking water for most of metropolitan Atlanta. Big Creek serves as a water supply for a portion of Roswell and is used for waste assimilation in Cumming, near the headwaters of the stream. This watershed contains some of the most dynamic corridors of development and growth in Georgia. Attendant water resource problems have dramatically increased and are impacting the hydrology of the Big Creek flows, altering the native plant and animal communities, affecting private property and increasing the risk of waterborne disease. This paper addresses a set of programs and actions that have been implemented in Alpharetta to influence a mutual will to protect the integrity of valuable water resources in the Big Creek Watershed.

INTRODUCTION

Throughout local history, Big Creek has provided recreational and scenic value to the jurisdictions through which it flows, and its wetlands have provided critical functions throughout the watershed. With available land, proximity to Atlanta and good infrastructure, the Big Creek watershed is rapidly developing with a population that doubled between 1980 and 1990 and is expected to double again by 2010 (ARC Population Forecasts, 1996). Monitoring data collected since 1991 indicate that water quality in this stream basin is deteriorating due to effects of urbanization and development. These effects are manifested by decreasing levels of dissolved oxygen, changing aquatic communities, increasing levels of phosphorous, too much erosion and sedimentation, flooding, and impacts from collective unidentified non-point source sources. All of these values result in declining water quality in Big Creek and more challenges for treatment plants to provide safe drinking water in sufficient quantities from this water source.

Without measures to protect the watershed, degradation of the stream will continue, affecting not only the quality of life within the watershed but also the quality of the Chattahoochee River, drinking water source for much of the metro Atlanta region. This has significance for: health (due to increased risk of waterborne disease outbreaks), economic vitality (due to the limitations on the availability of quantity and quality of water resources), and the important environmental balance that provides added value.

ENVIRONMENTAL INITIATIVES

Project Ripple

In 1990, due to obvious signs of changes in the riparian and stream corridors of Big Creek, Alpharetta Environmental Services (ES) determined that an action plan was needed to protect this valuable resource. If the visual changes could be substantiated with hard data, then evidence would be available to shape local and state laws needed to protect this stream. ES created a development team which consisted of Public Works, biologist, entomologist, State Soil and Water Conservation representative and a local volunteer organization plus the City Engineer. The comprehensive monitoring program was to include physical, chemical and biological assessments and tests, as well as immediate review of the data would enable identified problems to be addressed.

Considering the short and long term effects of the monitoring, congruous programs would be developed to provide the general public and elected officials with education to change behavior while offering opportunities for involvement in actions. And special education programs for K - 12 would create awareness of water resource issues and offer hands-on experiences to support and enhance the education.

The monitoring program, PROJECT RIPPLE, was initiated in 1991 as the first comprehensive water quality monitoring program in Georgia. Urban Waterbody Demonstration Grants totaling $50,493, including the 40% matching funds, gave the program its financial momentum. PROJECT RIPPLE still contains elements for: stream cleanup, chemical and physical data collection, biodiversity analysis, and on-the-ground problem solving. ES initiated the state concept of training as a pre-requisite for volunteers assuming any monitoring responsibility. To date, these regularly scheduled five hour workshops and other special water education classes, occurring more than 15 times per year, have reached thousands of people from all over Georgia and other states as well as teachers from Germany, Australia, Russia, and Africa. Serving local citizens and people beyond the jurisdictional boundaries of the city and in other parts of the watershed has earned ES the respect of peers and leaders from other communities influenced to do a better job of protecting water resources.

Starting with 38 stream segments, PROJECT RIPPLE has now grown to more than 50, monitored with some frequency, with main flows monitored monthly. The monitoring parameters are:

weather conditions, land use, degree of vegetative cover, signs of erosion, color and smell of water, water temperature, water depth, flow, macroinvertebrate abundance, other wildlife observed, turbidity, pH, dissolved oxygen, total dissolved solids, ortho-phosphate, conductivity, nitrate-nitrogen, fecal coliform, fecal streptococci counts. When it is deemed appropriate, additional tests are conducted for: lead, phenol, anionic surfactants, total chlorine, copper, alkalinity, sulfide, carbon dioxide, ammonia and soil tests. The ES Lab is managed by both the Director of Environmental Services and by a volunteer Microbiologist. It is the only public lab that is not directly associated with water treatment that is using fecal/strep ratios as a possible way to determine the point source of fecal waste, (human or animal). Wet weather and outfall monitoring are also conducted. These additional data sets are helping to identify more point sources of pollution and contamination. Data are shared with Forsyth County and Roswell when something unusual has been found from test results or through field inspection. There is interaction with state and federal regulatory agenceis, subject to the nature and severity of the known or suspected problem.

"One Call" And Volunteerism

Volunteerism is absolutely essential to positive change in the watershed. Volunteer stream monitoring influences public behavior through a combination of workshop training, direct monitoring responsibilities and real field education... learning by doing... having hands-on knowledge of how pollution and contamination affect the aquatic environments... knowing that problems uncovered during monitoring will be pursued to some resolution. To generate greater awareness of the issues and increase public involvement, ES began a "One Call" reporting process to solve suspected and obvious problems. The process is: a call is logged in with a problem description; the problem site is investigated and photographed; the appropriate city department or county/state/federal agency is informed; follow up occurs until there is resolution; the person reporting the problem is informed of progress along the way. This process has reestablished confidence in government and satisfies the public need to have an efficient way of dealing with problems and problem resolution. More than 100 water related problems were solved in fiscal year 1995-96, covering such things as erosion, wetlands violations, illegal disposal of waste, illicit swimming pool discharge, sewer line break, illegal discharge from a septic tank, and more.

Environmental Education Center

Supporting the broad range of education and stream monitoring, ES developed an Environmental Education Center (EEC) which opened in September, 1991. The center contains staff offices, a laboratory, a library of hundreds of environmental resources including videotape viewing equipment, a classroom, display area and reception/welcome office with a myriad of free handouts and a Speaker's Bureau. The EEC has been critical to furthering the overall education goals.

As part of environmental education outreach, a GREEN SCHOOL Program was implemented which, in five years, has grown to more than 35,000 children, plus parents and teachers from five counties. The intent of GREEN SCHOOL is to: develop strategies that bring environmental education forward as a tool in all academic disciplines; combine indoor instruction with hands-on experiences in created outdoor "living classrooms"; create avenues for GREEN SCHOOL participation in community service projects like stream monitoring as well as different recycling events. To round out the possibilities, a series of certified teacher courses in water resources was established, giving one staff development unit of credit for each ten hours of study.

ES is presently raising $1.4 million dollars to build a new, unique regional facility, The Georgia Environmental Education Center and Wetlands Complex, on 36 acres adjoining Big Creek. The land is owned due in part to $286,000 from USEPA, Region IV, allocated from fines levied for the destruction of wetlands. The new Center is vital to continuing the education of a growing population of all ages and will have: native botanical garden, special children's gardens, composting and recycling areas, plant nursery, observation and monitoring areas, conservatory with indoor stream, exhibit hall, environmental products store, classrooms, Big Creek watershed herbarium, library, offices, and a lab with teaching and research capability. The native botanical garden allows for on-site studies in streambank stabilization and erosion control. The American Institute of Architects sponsored a design competition for the complex, which helped provide some of the project funding from donations of products, services and cash. The project is described as a "living example of sustainable development integrated into a site with natural features unchanged since 1955."

Wetlands And Buffers

To expand the understanding of water quality and quantity issues, watershed tours, with an average of 46 people per tour, have been hosted since 1993. These have targeted the general public from the watershed and beyond as well as schools, combining knowledge with art opportunities. Another variation on the theme is planned for June 21, 1997 and is called "Wet and Wild Adventures". This is an all-day event to look at wetlands and the vital functions they provide towards a healthy natural environment. The event will take advantage of 37 acres of Big Creek wetlands located in another county but owned by ES. The land, valued at $175,000 was donated to ES as an educational preserve and represents a unique forested wetland.

Working with the City Engineering Department, ES chaired the committee that wrote the final draft of the Alpharetta Storm Water Management Ordinance containing a stringent requirement for a 100 foot buffer protection along a perennial stream. ES also provided the changes to the local version of the "Georgia Erosion and Sedimentation Control Act" which includes a stipulation that development can have no greater impact than a 25 NTU increase on state waters from the time the development process begins.

Additional Actions

The commitment is to always be sensitive to other opportunities for improving the water resources in the watershed. To this end, a recently awarded Urban and Community Forestry

Grant allows for a relational study between tree canopy and water quality. One outcome will be to establish dollar value for tree canopy and quantify the results of retaining trees on a site under certain conditions, rather than cutting them down and building expensive "best management practices" to do the job the trees would have done. Saving more trees and perhaps saving developers' money seems to be a very desirable goal in the course of community development.

Environmental Services reviews plans for development in the city. One recent requirement for a residential final plat to be filed is that an appropriate message must be placed on the plat notifying potential home buyers of restrictions on stream buffers and wetlands. Also, developers are required to stencil this message on storm drains: "KEEP WASTE FREE! DRAINS TO STREAM/RIVER.". This message in white paint helps to protect receiving waters from such things as grass clippings, chemicals, etc., and by virtue of being seen by the public, becomes part of the educational outreach.

Watershed Challenges

All of these many efforts, plus the trends from the stream monitoring data collection, have more clearly defined the existing and potential water resource problems and led to greater understanding of the cause and effect of human actions on the stream ecology, as well as on the plant and animal communities in the stream corridor. The efforts to inform and change behavior are never ending, however, due to the influx of people and businesses coming into this growing watershed. The challenges remain to inspire other communities in the watershed to "do more"... to energize other governments in the watershed to work cooperatively in solving problems. Dealing with the issue of limitations on impervious surfaces is a critical factor that must be considered in order to have better watershed management. This, too, will take great cooperation from all within the watershed.

CONCLUSIONS

As long as there is development, change and growth, there will always be a need to educate and offer action programs in Alpharetta and in the watershed. The Alpharetta programs have been successful with success being measured by community response, results and state/national awards. It bears out the opinion that the only way the Big Creek Watershed, indeed, any watershed or river basin in the world, will ever be protected is at the local level. This is where the most significant impacts are felt the hardest and where the greatest opportunity to take action and to measure results of that action occurs. To get the proverbial ball rolling at this level, someone has to step up and say, "I'll do it." Many times people expect this kind of leadership from their government, so it is often up to government staff to take the first step.

Local Government and Community Partnerships

Government need not work alone. Communities are full of people who want to make a difference but don't know what to do. Visionary leadership from government can take advantage of this valuable resource to influence change. Bring these community volunteers into a team with a mutually created "game plan". Help them to know their watershed: the water resources, the people, the businesses, the impacts, the byproducts of living and working in the watershed. These key people must be willing to develop a true team spirit promoting inclusive programs in order that all kinds of people from all walks of life will feel a sense of purpose when they volunteer. The team must be willing to acknowledge that *none of us is as smart as all of us*; that listening is part of communicating.

All must become very familiar with local elected officials as well as state and federal representatives who have authority over regulations and policies. The team must be persistent but patient, because all of the damage didn't happen over night, and the cures won't either. They must be dedicated and knowledgeable so they can inspire others to become better stewards. In the face of many challenges, they must remain reasonable, unbiased, yet firm in their resolve to protect water resources. They must be willing to stretch their minds with creative approaches to problem solving and to expanding their resource base in order to achieve results. They must be willing to review results and change courses if that is what it takes to get a better result. The team must take a position that education is the thread that weaves the fabric of positive change and that "those of us who know must teach those who do not." All must be willing to WORK... from wearing a suit and a smile while shaking hands at a special event to sinking in stream sediment almost to the boot tops in order to get a water sample while trying to avoid thinking about the 13° F air temperature.

Developing a strong program to protect water resources should be given the same up front considerations as the strategic planning done by successful businesses. This will certainly provide a community with a solid set of goals and actions from which to build and to grow. William Shakespeare said, "One touch of nature makes the world kin". A good environmental plan and good programs remind us of the wisdom in Shakespeare's words.

ACKNOWLEDGMENTS

The Georgia Soil and Erosion and Sedimentation Control Act, Amended and Adopted By Alpharetta, September, 1996

The Alpharetta Storm Water Management Ordinance, May, 1995

The Alpharetta Storm Water Management Reports, 1994, 1995, 1996

Alpharetta PROJECT RIPPLE Data, January 1991 To January 1997

Atlanta Regional Commission Population Forecasts, 1996